

V.K MISCELLANEOUS UNITS

The oil recovery system operated by the Clean Harbors San Leon facility includes oily waste physical/chemical separation and blending processes consisting of mix tanks, settling tanks, chemical addition, filtration, heaters, and centrifuges. The purpose of these processes is three-fold: 1) removal of gross quantities of water and/or solids from customer generated oily wastes, 2) removal of water and solids from oil recovered by the thermal desorbers, and 3) recovery of oil from oily-water streams produced by the other treatment systems. Operations are generally conducted in batches proceeding in the sequence of homogenous mixing with chemical addition, heating, settling, and centrifugation. Chemicals can optionally be added to the storage tanks prior to transfer to the mixing tanks. The operation is designed to be highly flexible in order to recover materials anywhere in the process and bypass any unnecessary batch sequences. Heat may be provided by a convection air heater. Recovered oils are stored for additional processing, blending, sales or other use. Water and solids removed are treated or disposed off-site.

Additional miscellaneous units are used for the pre-treatment of catalyst and petroleum-derived waste prior to management in the thermal desorbers as well as the cleaning of containers which have previously held catalyst and petroleum-derived waste before they are reused for transporting these wastes.

V.K.1 Centrifuges

Centrifugation is a process widely used in industry for separating liquids of different density, thickening slurries or for removing solids. Driven by an electric motor, a centrifuge puts an object in rotation around a fixed axis, applying a force perpendicular to the axis. The centrifuge works using the sedimentation principle, where the centripetal acceleration causes denser substances to separate out along the radial direction.

The Clean Harbors San Leon facility has two separate centrifuge systes; one for processing oil recovered from waste materials by the thermal desorbers, the second for recovering oil from oily wastes generated by facility customers.

Desorber Oil Centrifuge System –

The Desorber Oil Centrifuge System consists of one horizontal scroll centrifuge for gross separation of solids from recovered oil generated by the thermal desorber system, a high speed centrifuge for greater separation, and associated process and surge accumulator vessels. Centrifuge feed is received from the desorber oil loop transfer tanks and cleaned oil is sent either to the used oil storage tank (ST-8) or to the clean oil tank (ST-6) where it is recirculated back to the desorber oil scrubbers. Oil in ST-8 that meets specification is sold as on-spec used oil.

Solids from the centrifuge are collected in a roll-off container and shipped off site for disposal. Oily sludges flow to the Centrifuge Receiving Tank and subsequently are transferred to the HWDF tanks.

Customer Oil Recovery Centrifuge System –

The Customer Oil Recovery Centrifuge System consists of one horizontal scroll centrifuge for separation of water and solids from oily waste received from off-site customers, and associated process and surge accumulator vessels. The centrifuges are operated on a batch basis determined by customer demand. The centrifuge feed tanks (PV30-33) receive customer oily waste directly from tank trucks or from the Solids Handling System (T-200). The oil in the feed tanks may be heated, or chemicals may be added to improve processing by the centrifuges. From the feed tanks, oily waste is pumped to the centrifuges where additional chemicals may be added and heat applied to enhance separation.

Centrate oil is sent to the Oil Tanks (PV-34/35) where it may undergo further gravity separation. Emulsified oil is transferred to the Oil Emulsion Tank (ST-7) where it is used as make up for the oil scrubbers on the desorbers. Recovered Oil from the Oil Tanks is transferred to the Oil Sales Tanks (PV18-21) and sold as on-spec used oil.

Water separated by the centrifuge is sent to Wastewater Storage, treated by the Dissolved Air Flotation Unit to remove remaining quantities of oil and transferred to the final Wastewater Storage Tank (ST-17) for shipment off-site.

Solids from the centrifuge are collected in a roll-off container for shipment off-site for disposal.

In Appendix A drawing number 304 and 308 provide layout drawings and specifications for the centrifuges.

V.K.2 Heaters

The Clean Harbors San Leon facility utilizes three natural gas-fired heaters (HTR-1, HTR-3, HTR-4) to heat oil in the Oil Emulsion and Desorber Oil processes to enhance separation of oil, and entrained water and solids. HTR-1 is dedicated to the centrifuge system. HTR-3 is used in the desorber oil process.

V.K.3 Dissolved Air Flotation and Filter Press (Proposed)

The facility intends on installing a Dissolved Air Flotation (DAF) system and Filter Press to provide additional treatment of waste streams containing oily water and oily/watery sludges.

Dissolved air flotation (DAF) is a water treatment process that clarifies wastewaters by the removal of suspended matter such as oil or solids. The removal is achieved by dissolving air in the water or wastewater under pressure and then releasing the air at atmospheric pressure in a flotation tank or basin. The released air forms tiny bubbles which adhere to the suspended matter causing the suspended matter to float to the surface of the water where it may then be removed by a skimming device. The feed water to the DAF float tank may be dosed with a coagulant to flocculate the suspended matter.

A portion of the clarified effluent water leaving the DAF tank is pumped into a small pressure vessel (called the air drum) into which compressed air is also introduced. This results in saturating the pressurized effluent water with air. The air-saturated water stream is recycled to the front of the float tank and flows through a pressure reduction valve just as it enters the front of the float tank, which results in the air being released in the form of tiny bubbles. The bubbles adhere to the suspended matter, causing the suspended matter to float to the surface and form a froth layer which is then removed by a skimmer. The froth-free water exits the float tank as the clarified effluent from the DAF unit

Water from the centrifuges in the Oil Recovery System is collected in the Wastewater Storage Tanks and is processed in the DAF. Clarified water from the DAF is sent to the final Wastewater Storage tank for shipment offsite for disposal. Oil and trace solids from the DAF is sent to the centrifuge feed tanks for reprocessing by the centrifuges.

The Filter Press will be used primarily to remove solids from water generated by the desorber scrubbing system as well as from various sumps and general plant water. The filter press uses the principle of pressure drive, provided by a slurry feed pump. The filter press is a fixed volume and batch operation, which simply means that the operation must be stopped to discharge the filter cake before the next batch can be started. The major components of filter press are skeleton and filter pack. The skeleton holds the filter pack together while pressure is being developed inside filter chamber. It however can only hold a specific volume of solids.

The filter press utilized by Clean Harbors San Leon is a recessed plate filter press. The filter press is made up of polypropylene squares at about 4 feet across with concave depression and a hole in the center. Two plates join together to form a chamber to pressurize the slurry and squeeze the filtrate out through the filter cloth lining in the chamber. When the filter press is closed, a series of chambers is formed. The differences with the plate and frame filter are that the plates are joined together in such a ways the

cake recess on each plate, the cake thickness is restricted to 32mm unless extra frames are used which acts as spacers. The filter press is equipped with a mechanical “plate shifter”. The function of the plate shifter is to move the plates and allow rapid discharge of the filter cakes accumulated in between the plates.

The filter press receives wastewater containing solids from tank PV-12. Solids generated by the filter press are collected in a roll-off container and are shipped off-site for disposal. Filtrate is sent to ST9, ST10, ST211, ST17, then to final Wastewater Storage (ST-17) for shipment off-site for disposal.

In Appendix A drawing numbers 304 and 313 contain layout drawings and specifications on the Dissolved Air Flotation system and the Filter Press.

V.K.4 Container Wash/Decon Station (Proposed)

The proposed container wash/decontamination station will be used to clean oily and other residues from rolloff containers, totebins, flobins and other types of containers that are used to deliver recoverable material to the Clean Harbors San Leon facility. The station consists of a contained concrete pad measuring 35’ by 17’ designed with concrete walls on 3 sides (6’ at the rear, tapering to 4’ in the front. There will also be a berm at the front and a sump to collect cleaning solutions and residues removed from the container. Only containers considered RCRA-empty will be washed in the station. Typical cleaning solutions will include water and industrial grade detergents. High pressure water and steam may be used to help facilitate the cleaning. Cleaning solutions collected in the containment sumps will be pumped to storage tanks ST9, ST10, ST211, ST17 and either processed through the Dissolved Air Flotation (DAF) system to remove residual oil or shipped directly offsite for disposal. Water treated through the DAF will be stored and subsequently shipped offsite for disposal

V.K.5 Pre-Treatment Container (Proposed)

The proposed pre-treatment process will consist of mixing, treating and blending of catalyst or petroleum derived hazardous waste containing VOC’s < 500 ppm in a mixing container prior to feeding the waste to the thermal desorber units. The purpose of the process is to provide a consistent feed to the thermal desorber units to enhance recovery of oil and removal of organic material from catalyst substrate.

The pre-treatment container will be a mobile roll-off box with a capacity of approximately 25 cubic yards. The container will be placed in CSA - 14. Chemicals used in the pre-treatment process include, but are not limited to, lime, absorbents, dirt, and other chemicals that enhance the separation and recovery of oil from the catalyst and petroleum waste.

Catalyst and/or petroleum-derived waste received in roll-off containers, flobins and other containers will be transferred to the pre-treatment container using a bucket connected to a motorized mechanical shovel or back-hoe. Treatment chemicals will be added to the container and the contents mixed with the bucket. When the mixing is determined to be complete by the process operator, the contents of the pre-treatment container will be transferred by the bucket either to a feed container or directly to the “Live Bottom” hopper on the thermal desorbers.

V.K.6 Thermal Desorbers

The thermal desorber systems are described in Section XIII – Confidential Information.